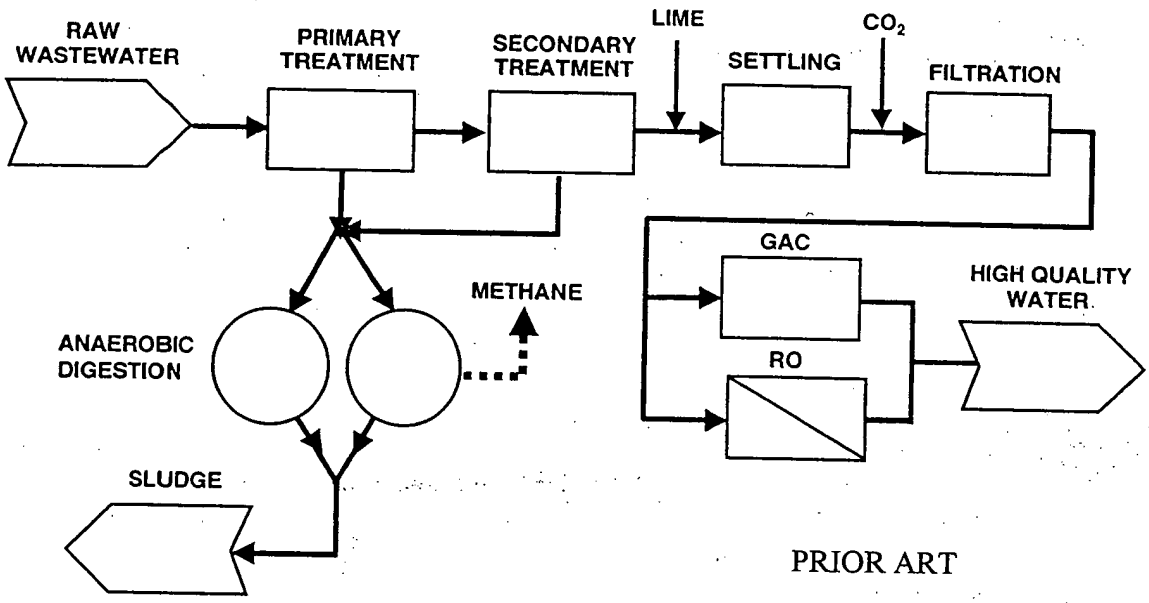
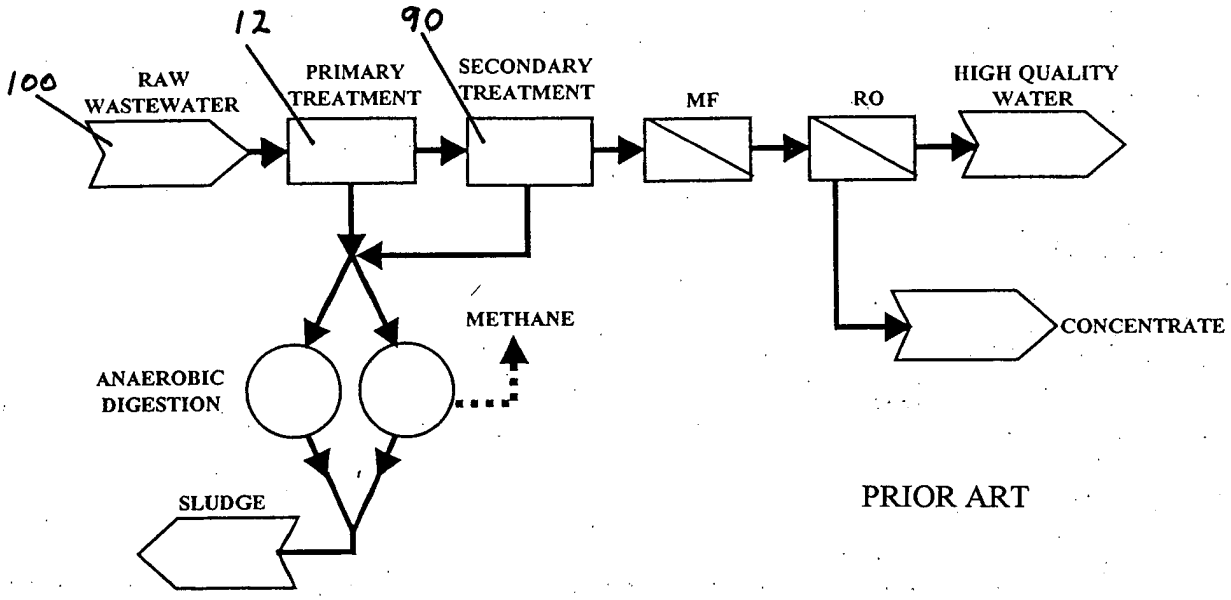
Figure 1



PRIOR ART

Figure 2



PRIOR ART

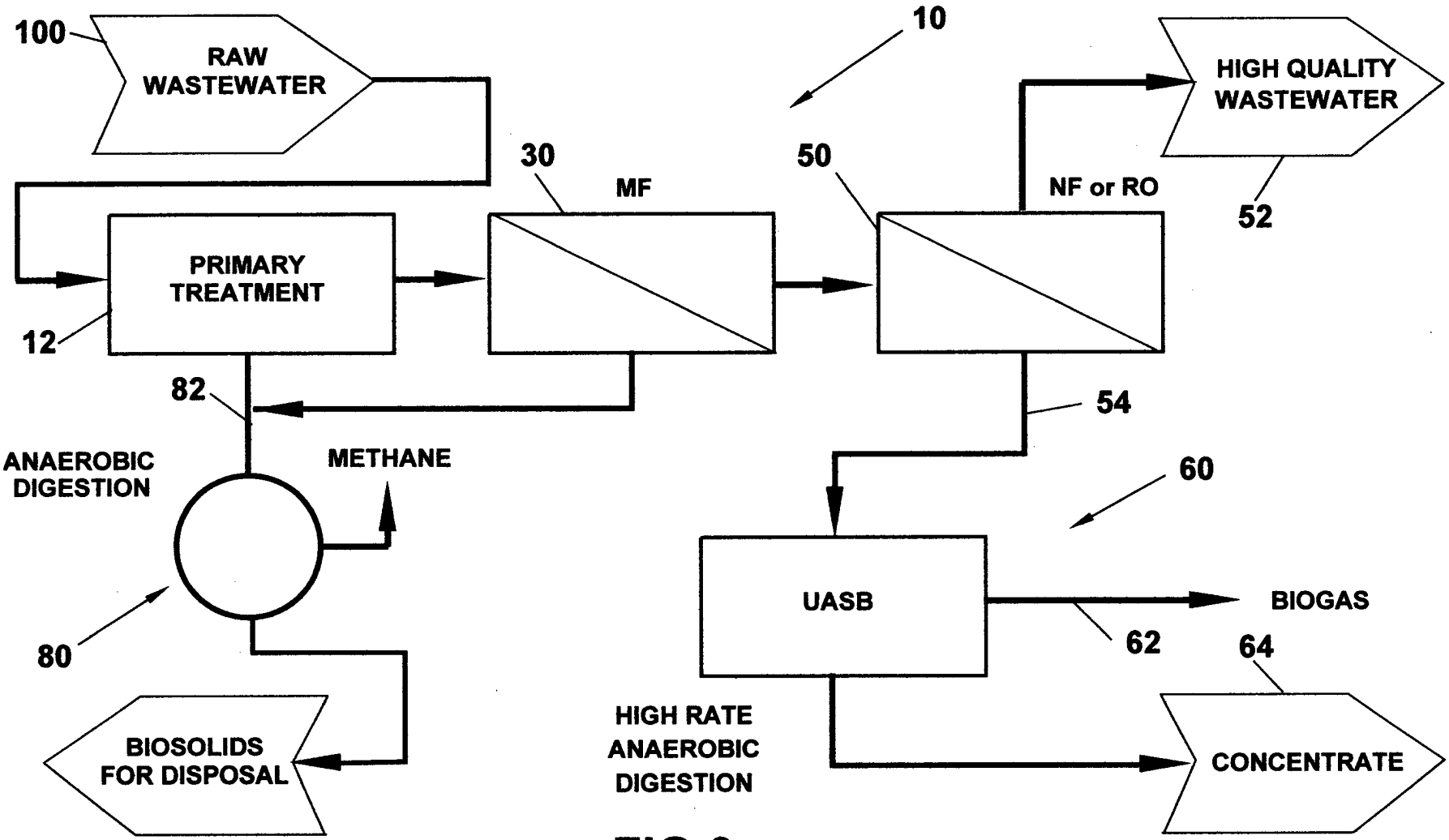

100
RAW WASTEWATER
10
HIGH QUALITY WASTEWATER
30
MF
50
NF or RO
52
PRIMARY TREATMENT
12
82
54
ANAEROBIC DIGESTION
METHANE
60
UASB
BIOGAS
62
64
80
BIOSOLIDS FOR DISPOSAL
HIGH RATE ANAEROBIC DIGESTION
CONCENTRATE

FIG.3

Figure 4

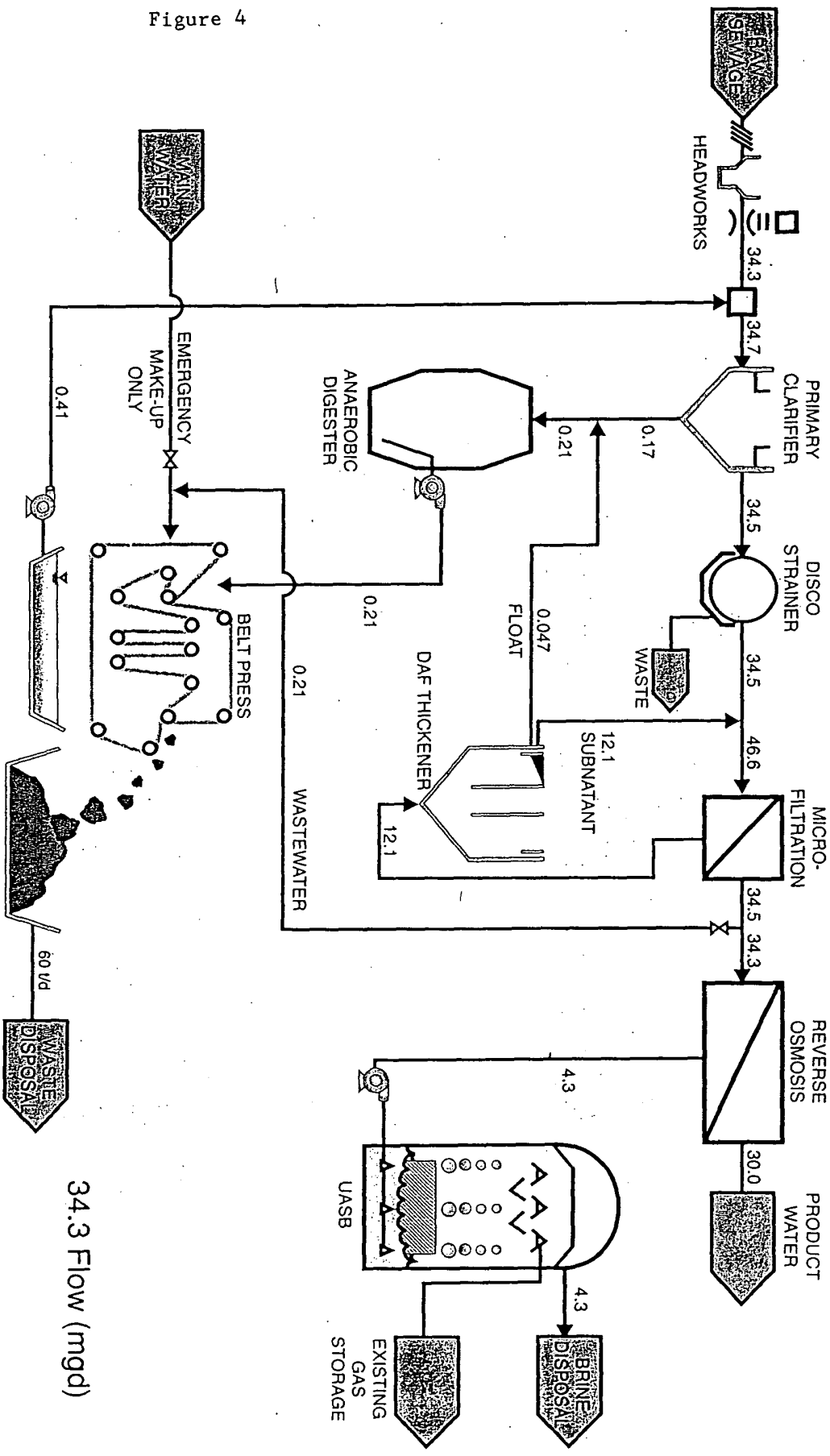
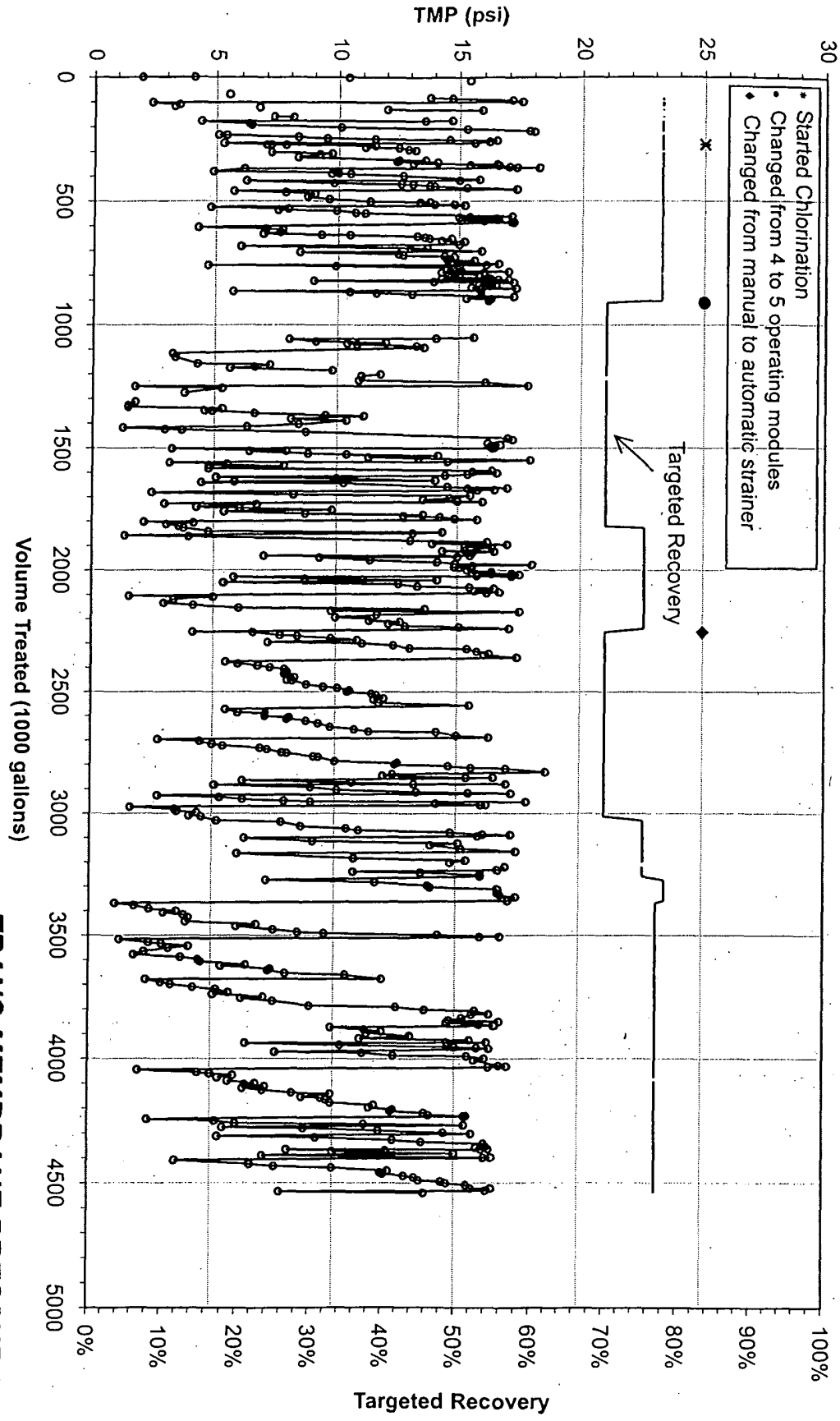
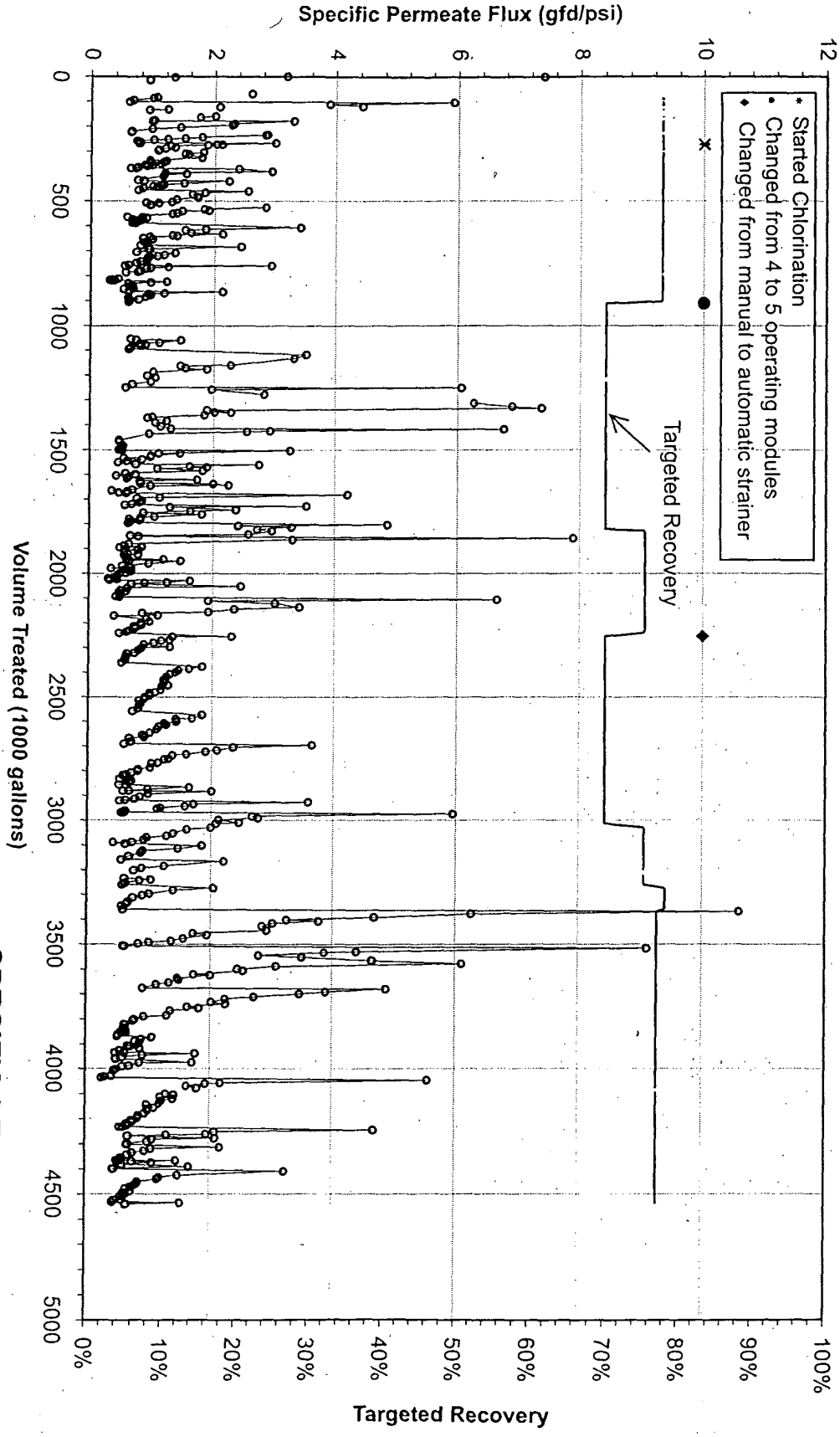

RAW SEWAGE
HEADWORKS
34.3
34.7
PRIMARY CLARIFIER
0.17
0.21
ANAEROBIC DIGESTER
34.5
DISCO STRAINER
WASTE
0.047
FLOAT
DAF THICKENER
12.1
12.1 SUBNATANT
34.5
46.6
MICRO-FILTRATION
34.5 34.3
REVERSE OSMOSIS
30.0
PRODUCT WATER
4.3
UASB
4.3
EXISTING GAS STORAGE
BRINE DISPOSAL
MAIN WATER
EMERGENCY MAKE-UP ONLY
0.41
0.21
BELT PRESS
0.21
WASTEWATER
60 t/d
WASTE DISPOSAL
34.3 Flow (mgd)

Figure 5



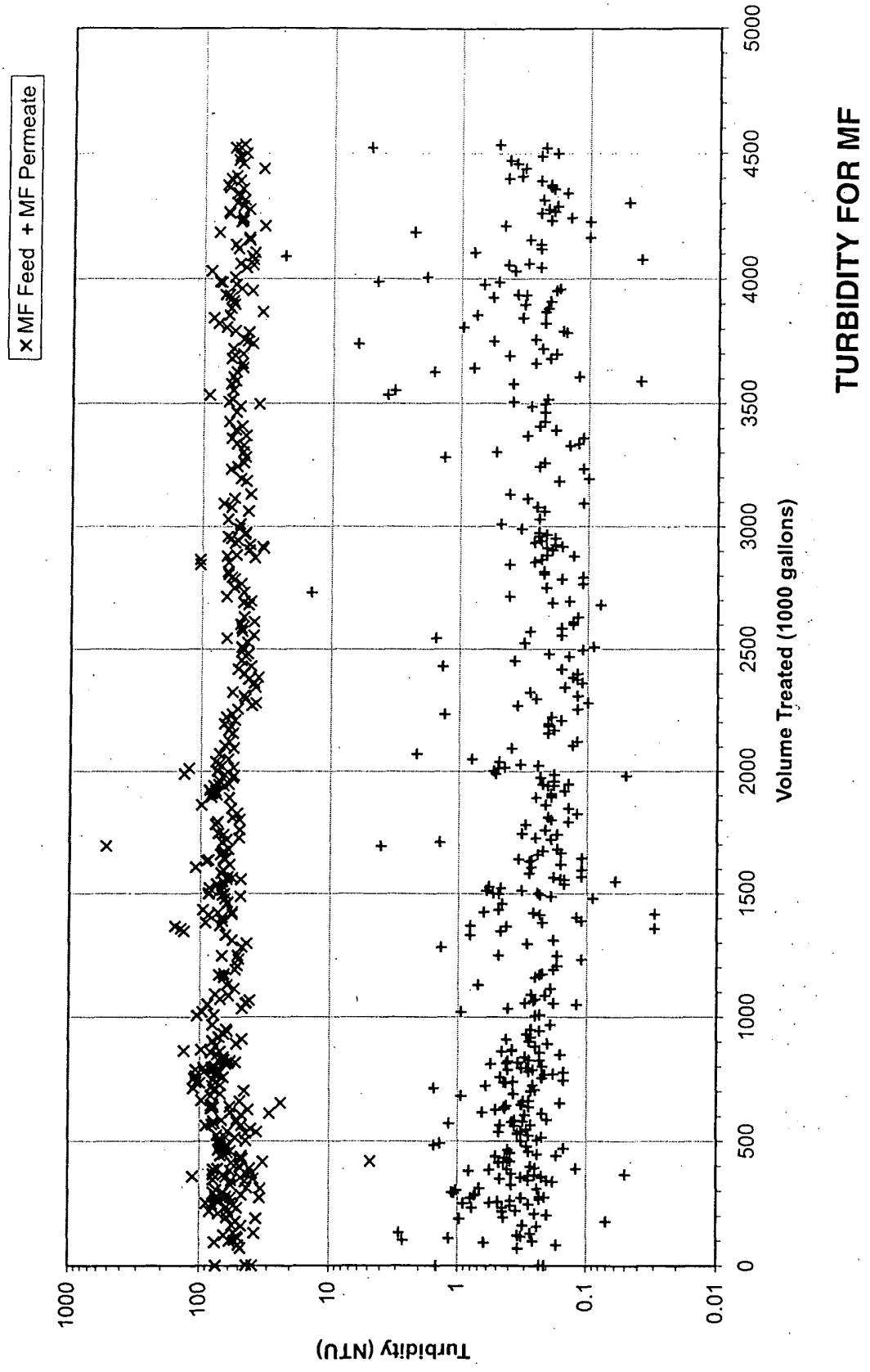
TRANS-MEMBRANE PRESSURE (TMP) FOR MF

Figure 6



SPECIFIC PERMEATE FLUX FOR MF

Figure 7


TURBIDITY FOR MF
× MF Feed + MF Permeate
Turbidity (NTU)
1000
100
10
1
0.1
0.01
Volume Treated (1000 gallons)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000

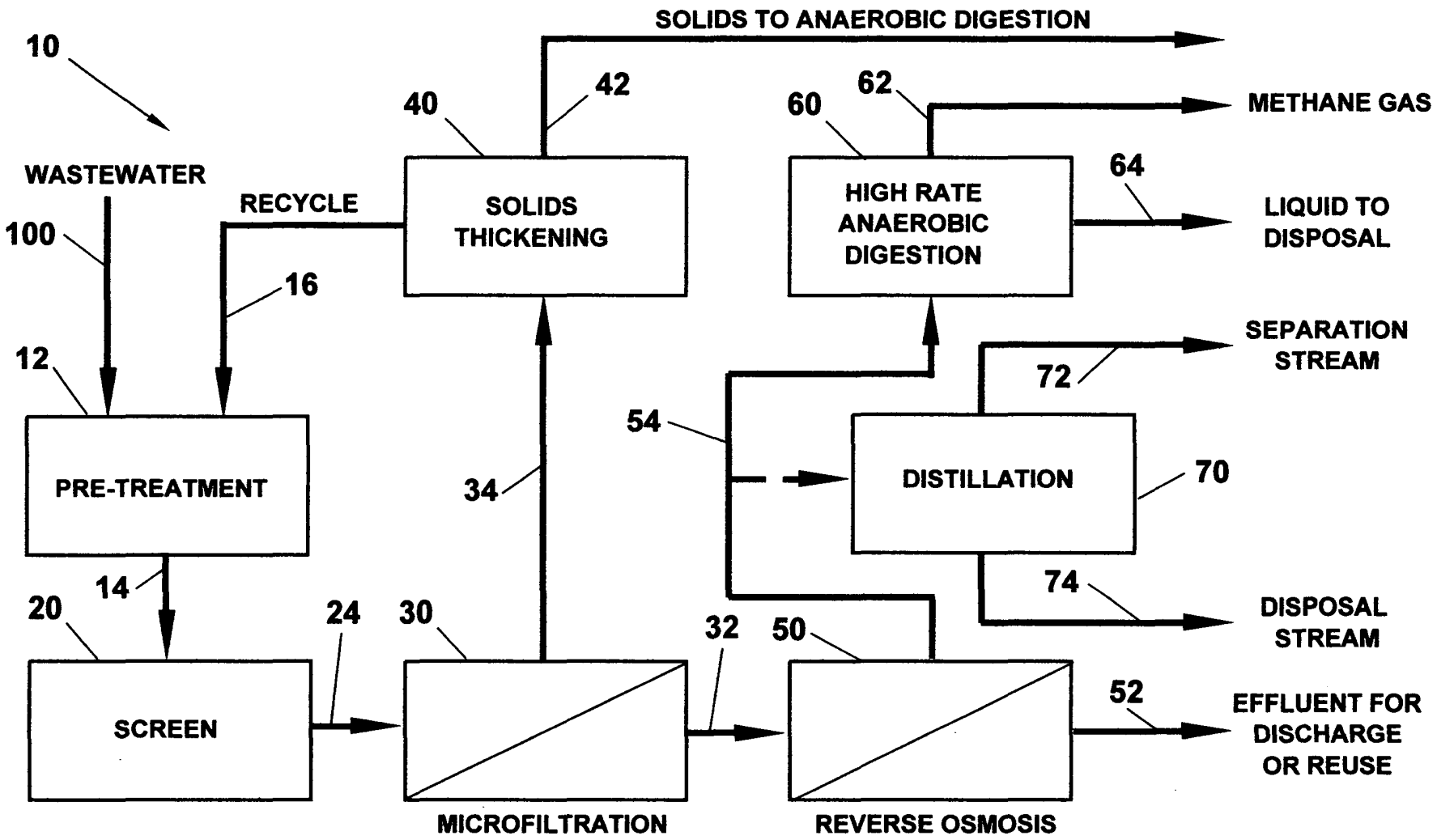

10
WASTEWATER
100
RECYCLE
16
12
PRE-TREATMENT
14
20
SCREEN
24
30
MICROFILTRATION
34
40
42
SOLIDS TO ANAEROBIC DIGESTION
SOLIDS THICKENING
60
62
METHANE GAS
HIGH RATE ANAEROBIC DIGESTION
64
LIQUID TO DISPOSAL
SEPARATION STREAM
72
54
DISTILLATION
70
74
DISPOSAL STREAM
32
50
52
EFFLUENT FOR DISCHARGE OR REUSE
REVERSE OSMOSIS

FIG.8